Math 251 # Maple assignment #4 **April 2 Version**

A web page which can help you with this assignment will be linked to the course webpage. You are encouraged to discuss this assignment with other students and with the instructors, but the work you hand in should be your own.

Every student will receive an e-mail message with information about a region in the plane, and with information about a region in space.

- The region in the plane will be defined by its boundary curves. Both curves will be of the form $y = f(x)$. One curve will be a straight line, and one curve will be the graph of a fourth degree polynomial. The area of the region will also be given.
- The region in space will be those points which are both inside a sphere centered at the origin, and above the graph of a circular paraboloid. The volume of this region will also be given. A density function, a polynomial possibly involving x and y and z, will be given.

Use `Maple` to help you answer the following questions.

Display the region in the plane graphically. Assume the region in the plane has constant density. Where is the center of gravity (centroid) of the region? Along the way, verify the value given for the area of the region.

Display the region in space graphically. Verify the value given for the volume of the region. Using the given mass density, find the total mass of the material filling the region.

This assignment is due **April 16**.

Please hand in the following material:

0. All pages should be labeled with your name and section number. Also, please *staple* together all the pages you hand in.
1. A printout of all `Maple` instructions you have used. (Yes, you may and should "clean up" by removing the instructions that had errors.)
2. A clear picture of the region in the plane.
3. Computation of the area of the region (verifying the given information), and the total moments about each coordinate axis. Compute the center of gravity of the region and plot it with the region (see background information for Lab 2 to see how to plot a point). Label the total moments and the coordinates for the center of gravity "by hand" on the print-out.
4. A clear picture of the region in space.
5. Compute the volume of the region, including appropriate specification of the intersection points of the two surfaces defining the boundary.
6. Compute the total mass in the region using the given density distribution by computing a triple integral or integrals.